WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
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CONTENTS

	Page
Abstracts:	
Biological Survey: Mt. McKinley National Park	2
Classification	2
Conservation	2
Cycles: Snowshoe hare	5
Destruction: Sea otter	5
Diseases and parasites	6
Ecology	10
Economics	16
Food habits:	
Arctic birds and mammals	17
Beaver	17
Bird consumption of pine seeds	17
Buteo hawks	17
Coyote	18
Elk browse	18
European partridge	18
Horned toads	19
Owls	20
Sciurus aberti mimus	20
Short-eared owl	20
Skunk	20
Life histories:	
Beaver	21
Coot	22
Coyote reproductive cycle	22
European moose	22
European partridge	23
Mountain lion	23
Muskrat	23
Pine mouse	24
Pocket mice	24
Sea otter	24

	Page
Abstracts--Continued	
Management:	
Bears in national parks	25
Bobwhite	25
Burning	26
Erosion control in relation to wildlife	26
Farm game	26
Fence rows	27
Forest wildlife	28
Game and hunting in Finland	31
General	32
Harvesting deer	32
Hungarian partridge in Europe	33
Miscellaneous	33
Otter	34
Planting for wildlife; hawthorns	34
Range	34
Salting to localize big game	35
Stocking	35
Stocking muskrats	35
By the TVA	35
Trapping deer	36
Water supply for desert quail	36
Pollution	36
Predation	37
Predators	39
Propagation	40
Research	41
Wildlife research and management leaflets	42
Notes and news	43
Author index for this issue	43

SPECIAL NOTICE

Requests for the publications abstracted, other than Wildlife Research and Management (BS) Leaflets, should be sent, not to the Biological Survey, but to the address given in the bibliographic citation to the particular paper desired.

Washington, D. C. No. 15 July, 1938

Biological Survey: Mt. McKinley National Park

Dixon, Joseph S. Birds and mammals of Mount McKinley National Park, Alaska, National Park Service, Fauna Series, 3 (Supt. of Documents, Washington, D. C., 35 cents a copy), xii+236 pp., 1 pl., 85 figs., 1938.

A beautifully illustrated faunal report of a high standard of excellence, treating 107 species of birds and 34 of mammals. The account of each species deals with identification, distribution, and life history. General matter in introductory pages relates to explorations of the area, the climate, faunal position, life zones, wildlife habitats, fluctuations in populations, and observational areas.

Classification: Ground squirrels

Howell, Arthur H. Revision of the North American ground squirrels, with a classification of the North American Sciuridae, U. S. Biological Survey, N. A. Fauna 56 (Supt. of Documents, Washington, D. C., 40 cents a copy), 256 pp., 32 pls. (11 col.), 20 figs., April 1938.

Habits and economic relations of 25 groups of ground squirrels. Classification of the N. A. Sciuridae including key to the genera and subgenera, further description of the characters, and citation of type species. Revision of the genus Citellus in 97 subspecies representing 31 species. There are keys to all forms, maps of their distribution by groups, and in the discussion of each, synonymy, notes on type and type locality, range, characters, and variation; measurements, remarks, and list of specimens examined. There is an account of 8 fossil forms, a 10-page bibliography, and an extensive index.

Classification: Lespedeza

Pieters, A. J. Some lespedeza relationships, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 3(11), May 1938, pp. 265-266, 17 figs.

Lespedeza species occur naturally only in eastern Asia and eastern North America. There are about 125 species of which 20 are American and only 11 of those common. Description of groups of species, with especial emphasis upon the identification of L. sericea.

Conservation: Fur animals

Hamilton, W. J., Jr. Our fur-bearers--a vanishing natural resource, New York Zoological Society Bul. (185th St. & Southern Blvd., New York, N. Y., 35 cents a copy), 41(3), May-June 1938, pp. 94-101, 7 photos.

Figures are given showing the number of firms and persons engaged in the fur business and the annual turnover in skins and their money value. Receipts to trappers are widely distributed as a great deal of trapping is

done incidentally to other employment. Fur animals have value also as objects of sport and for food. Diminution of certain species and of all combined is described; each year sees a decrease. Protective legislation has always lagged and is still deficient. Instances of the effectiveness of protection of the beaver and otter. Preservation of suitable environment is a necessity. Control of predatory animals by poisoning has resulted in the death "of thousands of useful furbearers which are of no concern to the stockmen." Fur-farming is effective only in the case of the silver fox and to a lesser extent of the mink; it will not save the vanishing fur animals. "Fur merchants and the large raw fur receiving houses may be held partly responsible for this alarming crisis. By issuing price lists long before pelts are prime, it becomes a virtual invitation for the trapper to ply his trade prematurely. Overtrapping is thus encouraged by the very institution which should be most concerned with fur conservation. By accepting at a price any skin offered, the fur buyer encourages the trapper to clean up. Our fur-bearers are at the crossroads. Many of our most valued species are gone from areas that were well populated a few years back. The population of others has been so substantially reduced that they do not figure in the fur crop. If we are to conserve a part of this important resource, we must do so without delay."

"The death knell of several species was sounded long ago. Others are being crowded into oblivion. There is no necessity for terminating the vast annual harvest, involving a partial livelihood to many thousands of individuals. The fur trade is a billion-dollar industry. But we must face the fact that the remnants of our rich fur resources are fast diminishing. National conservation organizations and champions of wildlife everywhere must sound the alarm. Only through concerted effort can this fine native fauna be saved."

Comment: Something may have been omitted from the last paragraph or the wording changed as there does seem to be great need at least of considerably curtailing the fur harvest. In fact animals having the unfortunate distinction of producing high priced pelts are in the same position as the egrets were in the days of the plume trade; the financial temptation is so great that legal bars cannot prevent covert exploitation. It was elimination of the market that saved the egrets and probably no less drastic a step will avail the most valued fur-bearers.

Conservation: History in Wisconsin

Scott, Walter E. Conservation history, Wisconsin Conservation Bul. (State Conservation Dept., Madison, Wis.), 3(4), April 1938, pp. 26-37.

Supplemental information on the period 1915-18 and extension of the history to 1921-22. See also WILDLIFE REVIEW, Nos. 9, July 1937, p. 3; 10, October 1937, p. 3, and 11, February 1938, p. 3.

Conservation: Need in British Empire

Hubback, Theodore. Principles of wildlife conservation, Journ. Bombay Nat. Hist. Soc. (6 Apollo St., Bombay, India, 10 rupees a copy), 40(1), April 1938, pp. 100-111, 4 pls.

This is a plea addressed apparently to the British Empire in general. "Are the principles of Wild Life Conservation to continue as elusive conceptions without material form, or are they to become a living presence increasing in virility year by year? There appears to be a danger that these principles will be sacrificed for private profit. The present tendency to exploit all natural resources regardless of the future will eventually result in the disappearance of many species of the larger fauna unless such tendency is drastically checked. Until it is recognized that Wild Life is a valuable natural resource and that the benefits derived from an unguarded resource are wasting benefits x x x waste will continue till the resource has gone and the benefits have vanished."

The author strongly urges as a necessity for wildlife conservation of an independent organization with funds (derived from fixed sources) over which it has full control. Evidently he is impressed by the American system, particularly as exemplified in Pennsylvania, referring to it at some length. Skilled inquiry and research are needed to show what there is to conserve and how to conserve it. There being so many good reasons for wildlife conservation, the public may be expected to support it. Conservation should be based on so sound a policy and upon such dependable resources that it will not be destructively restricted during periods of stress. Hazards to conservation in Southeastern Asia and in Africa are discussed.

"After all, what are the principles of conservation which we can apply to wild life? I think we may claim that the chief object of conservation of wild life must be to prevent the disappearances of species. We cannot say we don't want such-and-such a species because it eats our fowls or disturbs our garden; its benefits to the universe in other ways may be more important than our pet fowls or our local garden. We can say we don't want such species in our backyard and we can take steps to protect our property, but we are wrong if we say such-and-such species should be exterminated. Our knowledge is much too incomplete to allow us to say anything of the sort. x x x Therefore, I think the practical application of steps to prevent extermination of species must be the foundation on which to build our framework of conservation. This can be done in many ways, but the most certain, most equitable and most spectacular method of achieving this is by setting aside certain areas of suitable land as permanent sanctuaries for the fauna."

"A wise policy of wild life conservation will provide for: (1) Adequate laws for protection; (2) adequate areas as permanent sanctuaries or refuges for species in their known habitat; (3) adequate organizations to enforce the former and administer the latter. If these three principles are insisted on, then we may have some hope for the future of the fauna of our Empire, but unless steps are taken, and taken soon, to recognize the critical

state of the wild life in many of our Colonies and Dependencies, and to check the present rate of destruction, the future can be contemplated only with apprehension. To those who know how inefficient and inadequate in many places our methods of wild life conservation are, the wild life in such places appears doomed to extinction. You can replace trees; you can sustain domestic animals by private breeding; but wild life must have an environment of its own in which to thrive and increase in a natural and normal fashion. The price to pay for the neglect of the observation of conservation principles as applied to wild life is a terrible one--no less than the disappearance forever of species after species."

Conservation: Waterfowl

Brant, Irving. "Sportsmen's" heaven is hell for ducks, Emergency Conservation Committee (734 Lexington Ave., New York, N. Y.) Publ. 71, 16 pp., 4 cartoons, 2 graphs, June 1938.

Some wealthy killers and organizations of them are interested only in preserving and increasing shooting privileges, not in conservation of the wild fowl. They seek to monopolize duck shooting by restoration of the use of bait and live decoys. They are in the minority but are powerful and should be steadily resisted. The 25 percent increase in waterfowl reported to have occurred since 1934 is insignificant considering the great need for restoration. "It would take an increase of 250 per cent--ten times as great--to bring waterfowl back to their numbers just before the 1930 drouth." The waterfowl belong to all citizens and must be preserved regardless of adverse pressure by special interests.

Cycles: Snowshoe hare

Chitty, Dennis, and Charles Elton. The snowshoe rabbit enquiry 1936-37, Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada, 25 cents a copy), 52(5), May 1938, pp. 63-72, 2 tables, 3 figs. (including 5 maps).

The 7th paper in a series reporting on the enquiry begun in 1931. Then the cycle was approaching its peak and now it is again showing upward trend. An interesting feature is great variance in phase of the cycle with locality. The report covers epidemics among the hares as well as data on increase and decrease.

Destruction: Sea otter

Andrews, C. L. Children of the sea, Alaska Sportsman (Ketchikan, Alaska, 15 cents a copy), 4(7), July 1938, pp. 8-9, 27-28, 31-32, illus.

History of the exploitation of the sea otter from the time of Bering (1742). It was barbarously and solely destructive throughout Alaska and even Californian waters down to the time of Wrangel (1830). He instituted restrictions on killing which, continued for about 25 years, resulted in some

restoration. Then came transfer to Usonian sovereignty and renewed exploitation pursued to such a length that in 1910, 31 schooners engaged in the business took only 30 skins. Since then protection by treaty has been established and in the most favorable localities the animals have again increased.

Diseases and Parasites: Anemia

Jellison, Wm. L. Tick-host anemia: A secondary anemia induced by Dermacentor andersoni Stiles, Journ. Parasitology (Lime and Green Sts., Lancaster, Pa.), 24(2), April 1938, pp. 143-154, 6 tables.

The experimental work was with domesticated rabbits but reference is made to anemia in wild moose, jack rabbits, and foxes. Author's summary: "The writers have repeatedly produced a secondary anemia in rabbits by heavy infestations of ticks, Dermacentor andersoni. This condition is noninfectious but is due primarily to exsanguination by the rapidly engorging female ticks and appears comparable to the anemia observed in tick-infested domestic stock and game animals. It is believed, therefore, that tick-host anemia is not only an experimental disease but occurs with some frequency in nature and may be the immediate cause of death in animals." Bibliography of 7 titles.

Diseases and Parasites: Blood parasites, Nebraska birds

Coatney, G. Robert, and Evaline West. Some blood parasites from Nebraska birds--II, American Midland Naturalist (Notre Dame, Ind., $1.00 a copy), 19(3), May 1938, pp. 601-612, 1 pl., 2 tables.

Haemoproteus archilochus from the ruby-throated hummingbird, H. quiscalus from the bronzed grackle, and Leucocytozoon coccyzus from the yellow-billed cuckoo are described as new. There are notes also on previously described species of Haemoproteus, Leucocytozoon, Plasmodium, and Trypanosoma and on some unidentified Haemoproteus, including descriptions, measurements, and names of hosts. Bibliography of 11 titles.

Diseases and Parasites: Coccidiosis

Kellogg, H. B., Jr. Coccidia and the fox, Wisconsin Sportsman (2004 Winnebago St., Madison, Wis., 10 cents a copy), 2(8), May 1938, p. 2.

General discussion of the occurrence, progress, and symptoms of the disease. Adults have some degree of resistance but pups are seriously affected. There is no effective treatment and thorough sanitation is the best defence. Depending on the period required for the life cycle of the parasite (and there being no reinfection), the disease is self-limited. Careful feeding and protection from unfavorable conditions constitute good treatment for affected animals.

Diseases and Parasites: Dangers of introduction with cottontails

Chaddock, T. T. Some facts concerning cottontails imported into Wisconsin, Wisconsin Conservation Bul. (State Conservation Dept., Madison, Wis.), 3(4), April 1938, pp. 49-52.

Report on autopsy of 14 specimens from Kansas. Coccidia, tapeworms, flukes, nematodes, and tularemia bacilli were demonstrated in these animals. The diseases caused by these parasites are discussed and the danger of introducing them emphasized.

Diseases and Parasites: Dog tick

Bishopp, F. C., and Carroll N. Smith. The American dog tick, eastern carrier of Rocky Mountain spotted fever, U. S. Dept. Agr. Circ. 478 (Supt. of Documents, Washington, D. C., 5 cents a copy), 25 pp., 13 figs., 8 tables, April 1938 (June).

The dog is the most common host of adults and nice of the immature stages of this tick. Rabbits are of little importance, and birds do not serve at all, as hosts. Dermacentor variabilis is concerned in the transmission of spotted fever, now increasing in eastern States, and of tularemia. Distribution, hosts, life history, seasonal incidence, overwintering, and natural and artificial control are discussed. Bibliography of 15 titles.

Diseases and Parasites: Eelgrass disease on the Pacific Coast

Young, Edward L., III. Labyrinthula on Pacific Coast eel-grass, Canadian Journ. Research (National Research Council, Ottawa, Canada, 25 cents a copy), Sec. C, 16(2), March 1938, pp. 115-117.

Note on occurrence of Labyrinthula, recognized as the causative agent of the wasting disease of eelgrass on the Atlantic Coast. Report of its discovery in specimens from Nanaimo, British Columbia. Discussion of factors possibly related to occurrence of the parasite. Comment: If the wasting disease proceeds as it has on the Atlantic Coast, the effects in reducing an important food of Pacific Coast waterfowl will be serious.

Diseases and Parasites: Microfilarial periodicity

Boughton, Donald C., Elon E. Byrd, and Horace O. Lund. Microfilarial periodicity in the crow, Journ. Parasitology (Line and Green Sts., Lancaster, Pa.), 24(2), April 1938, pp. 161-165, 1 fig., 1 table.

Method of making counts, variations in them, and possible correlations with periods of activity and calm in the host. Bibliography of 6 titles.

Diseases and Parasites: Minnesota investigations

Green, R. G. et al. Minnesota Wildlife Disease Investigations (Dept. of Bacteriology, University of Minnesota, Minneapolis), December 1937, pp. 169-177, tables 100-103; January 1938, pp. 1-6, tables 1-2; February 1938, pp. 7-14, tables 3-7; mimeographed.

December.--Incidental autopsies yielded information on blackhead in quail, nematode infection in Hungarian partridge, and shock disease in the snowshoe hare. A note is given on the current phase of the cycle of the last-named species as revealed by trapping. There is a special article (pp. 173-177) by R. G. Green, C. A. Evans, and W. E. Carlson on Chastek paralysis, a disease of penned foxes due to deficiency in vitamin B brought on by the use of fresh fish in the diet.

January.--Gross lesions of tularemia in cottontail rabbits and snowshoe hares are described and compared. They are pronounced in the susceptible rabbit but usually obscure in the resistant hare. Autopsies revealed blackhead as the cause of death of 6 out of 9 quail from the State game farm. A few miscellaneous necropsies are presented as well as data on the progress of the snowshoe hare cycle.

February.--The comparative pathology of tularemia is tabulated and described for 3 species of mammals and 4 of birds. Cottontails and muskrats dying from tularemia in nature usually show abscesses of the liver and spleen; snowshoe hares and birds seldom do. Data on experimental tests of the immunity of snowshoe hares to tularemia are presented in tabular form and briefly discussed. There is a preliminary report on a test of "brush" as food for hares, the results of which indicate that "brush" is not a complete diet. Included also are notes on the pathology of miscellaneous specimens, and on the tendency of the cycle in hares.

Diseases and Parasites: Parasites of rodents

Erickson, Arnold B. Parasites of some Minnesota rodents, Journ. Mammalogy (Wm. H. Burt, University Museum, Ann Arbor, Mich., $1.00 a copy), 19(2), May 1938, pp. 252-253.

Reports on examinations of 88 mice of 6 species, giving the proportion infested, and the kinds and numbers of parasites, including nematodes, cestodes, flukes, fly larvae, fleas, and biting and sucking lice.

Diseases and Parasites: Pneumonia in bighorn

Marsh, Hadleigh. Pneumonia in the Rocky Mountain bighorn sheep, Journ. Mammalogy (Wm. H. Burt, University Museum, Ann Arbor, Mich., $1.00 a copy), 19(2), May 1938, pp. 214-219.

In animals from Glacier and Yellowstone National Parks and from Sun River Canyon, Montana, the primary etiological factor in the disease was the lungworm, Protostrongylus stilesi, with secondary bacterial invasion. Of organisms involved in that infection, the chief is "the diphtheroid Corynebacterium pyogenes, although a Pasteurella is constantly present in the diseased lungs. x x x It seems probable x x x that the lack of normal winter range, causing crowding and overgrazing on the fall and spring range, combined with feeding in the case of the Glacier Park sheep, are factors in the development of clinical parasitism and secondary bacterial pneumonia x x x The losses from pneumonia in young lambs on the National Bison Range are of a different type x x x Parasites are not involved x x x and the pneumonia is of an acute type. Our findings in the only two cases in which bacteriological and histological work was done indicate that the pneumonia is primarily due to invasion by a Pasteurella, with C. pyogenes as a secondary invader."

Diseases and Parasites: Ruffed grouse

Clarke, C. H. D. Organisms of a malarial type in ruffed grouse with a description of the schizogony of Leucocytozoon bonasae, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 146-150, 1 pl.

Author's abstract: "The occurrence of Leucocytozoon bonasae in the ruffed grouse has been associated with a cycle in numbers. Schizogony takes place in endothelial tissue and must be studied in section. Differences in schizogony can be interpreted in terms of resistance in the host. Gametocytes do not appear in the blood of the young until a check in the multiplication of schizonts has occurred. In winter, infection is represented only by a small number of cyst-like schizonts. Besides leucocytozoa, Haemoproteus, not previously recorded from ruffed grouse, was found in preparations made in the summer of 1935." Ontario, Canada.

Diseases and Parasites: Ticks of British Columbia

Hearle, Eric. The ticks of British Columbia, Scientific Agriculture (1005 Confederation Bldg., Ottawa, Canada), 18(7), March 1938, pp. 341-354.

A list of the species (19) known or believed to occur in British Columbia, also a list of hosts and the ticks known to attack them. Remarks on distribution and abundance of the species and on disease-transmission by ticks. The author died in 1934 and the paper has not been brought down to date. Bibliography of 28 titles.

Diseases and Parasites: Trematode from beaver

Kofoid, Charles A., and James T. Park. A new trematode, Paramphistomum castori sp. nov., from Castor canadensis baileyi Nelson, from Mary's River, Nevada, Univ. Calif. Publ. Zool. (University of California Press, Berkeley, Calif.), 41(27), pp. 419-422, 1 fig., 1937.

Original description and illustrations; bibliography of 5 titles.

Diseases and Parasites: Trematodes of birds

Cheatum, E. L. Tanaisia pelidnae n. sp. and Orchipedum tracheiola (Trematoda), Journ. Parasitology (Lime and Green Sts., Lancaster, Pa.), 24(2), April 1938, pp. 135-141, 1 pl.

The new species is from a red-backed sandpiper (Pelidna a. sakhalina) collected in Michigan. There is an account of previously described species and detailed comparison with two of them. A history of study of the genus Orchipedum also is given and description of the species named which is recorded from the white-winged scoter. Both are figured and there is a bibliography of 13 titles.

Diseases and Parasites: Trematode from muskrat

Olivier, Louis. A new trematode, Allasogonoporus marginalis, from the muskrat, Journ. Parasitology (Lime and Green Sts., Lancaster, Pa.), 24(2), April 1938, pp. 155-160, 1 fig.

New genus and species based on specimens collected in Michigan, illustrated. Discussion of family relationships. Bibliography of 15 titles.

Ecology: Acorn distribution by squirrels

Olmsted, Charles E. Vegetation of certain sand plains of Connecticut, Botanical Gazette (University of Chicago Press, Chicago, Ill., $2.50 a copy), 99(2), pp. 209-300, 26 figs., 6 tables.

The point of interest to wildlife managers is that, "Black oak invades many communities through burial of its acorns by squirrels." Without dispersal by squirrels, Quercus velutina would not enter many of the areas, and even though acorns were present, establishment would not occur without burial. "Acorns in squirrel caches are usually buried to a depth of 2 to 4 inches, each cache being from 1 to 3 feet in length and 2 to 3 inches wide. The range in number of acorns found in many caches was 23 to 84 and the average about 40." Notes are given on germination of the cached acorns and photographs illustrate sprouts and trunks arising from caches.

Ecology: Animal checks on oak reproduction

Wood, O. M. Seedling reproduction of oak in southern New Jersey, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.50 a copy), 19(2), April 1938, pp. 276-293, 4 figs., 2 tables.

Squirrels and other animals destroy acorns on the tree, on the ground, and in seed beds and eat also the seedlings. Animal-proof enclosures, however, can be made. Coatings of red lead and of Crotox repelled attack as long as viscous, but not when dry. The combined animal attack may almost entirely eliminate seedling reproduction.

Ecology: Bees in relation to planting programs

Paddock, F. B. Relation of beekeeping to wildlife conservation, American Bee Journal (Hamilton, Ill.), 77(11), Nov. 1937, pp. 519-520, 549.

The relation, somewhat tenuous, is that planting programs of the Soil Conservation Service and other organizations will increase forage for bees and the latter will benefit the plantings by insuring their fruitfulness.

Ecology: Carrying capacity, big game

Young, Vernon A. The carrying capacity of big game range, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 131-134, 1 pl., 1 table.

The use of airplanes in counting big game and of the square foot density method of estimating available browse are new tools which enable the wildlife manager to go forward more confidently with all matters depending upon adequate knowledge of carrying capacity. Overbrowsing is described and illustrated. Available and palatable browse plants on two National Forests in Idaho are tabulated; Ceanothus and Salix lead. The square foot density method of appraising vegetation and its applications are described.

Ecology: Census methods for mammals

Dice, Lee R. Some census methods for mammals, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 119-130.

Author's abstract: "Counts of populations on given areas for a few kinds of mammals may be made by organized drives. For most small forms, however, the size of population must be calculated from a determination of the average size of the individual home range. Several methods are proposed for making such calculations. Where counts of individuals cannot be taken the frequency index is often useful."

Ecology: Census of waterfowl broods

Stoudt, Jerome H. The number of waterfowl and the kill on the Chippewa National Forest, 1937, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 82-93, 1 fig., 15 tables.

Methods and results of a waterfowl brood census tabulated according to types of habitat and by species. Comparative abundance of the kinds of ducks also is shown in a table; leaders are: mallard (32%), blue-winged teal (22), golden-eye (20), and baldpate (13). The hunting take is analyzed according to the type of lake where made, and tabulated by species in a way to show not only the kill but its relation to the number of birds produced on the Forest. In 1937, "The kill during the open season exceeded the summer population by 30% or approximately by 9,000 ducks."

Ecology: Drainage operations

Authors. Proceedings of the 24th Annual Meeting of the New Jersey Mosquito Extermination Association (Agricultural Experiment Station, New Brunswick, N. J.), 1937, 239 pp., illus.

Four papers, while not devoted to discussion of the inter-relations of mosquito control operation and wildlife conservation, pay some attention to the subject.

W. S. Corkran of the Delaware Mosquito Control Commission refers to the acquisition of lands by the Biological Survey and Resettlement Administration, which are great mosquito-breeding areas, and to efforts to get those organizations to agree to programs of mosquito control. He says, "we believe that mosquito control can be attained with little harm, if any, to wildlife. On many marshes, it can be practiced, we believe, with actual benefit to the desirable wildlife." (p. 141.)

Norman Taylor, the well known plant ecologist, discussing objections to ditching of the salt-marshes of Long Island, expresses the opinion, based on field research, that opposition cannot justly be predicated on alleged change in ecology. In the conclusions of his Preliminary Report on the Relation of Mosquito-control Ditching to Long Island Salt-marsh Vegetation (pp. 211-217), he states that, "Ditching has made no fundamental change in the make-up of the salt-marsh vegetation." (p. 217.)

Dr. L. L. Williams of the U. S. Public Health Service, noting that there being a considerable roving population, including no doubt some carriers of malaria, the disease may be reintroduced into parts of the country that have been considered practically free from it. Recent increase in water impoundment emphasizes the risk. Among other precautionary suggestions is one that, "The creation of new wildlife refuges should be confined to relatively uninhabited areas, or else anopheline control should be an integral part of the plan for the refuge." (p. 220.)

Dr. Thomas J. Headlee, State Entomologist of New Jersey, in his address on mosquito problems referred to the wildlife situation in the following words: "In view of the present movement for the preservation of wildlife, I think it is obvious that mosquito-control organizations must collect data on the relation of mosquito production to other forms of wildlife, both beneficial and injurious to man. Failure to do this may encourage the establishment of wildlife refuges which in themselves may become tremendous producers of mosquitoes and affect adversely the health and property values of persons living in their neighborhood. Also, the accumulation of data should be carried forward on the relation of antimosquito works to the growth and propagation of other forms of wildlife, both harmful and beneficial. The remarks which were made concerning funds in connection with the study of natural enemies of mosquitoes apply with equal force here."

Ecology: Farm wildlife

Allen, Durward L. Ecological studies of the vertebrate fauna of a 500-acre farm in Kalamazoo County, Michigan, Ecological Monographs (Duke University Press, Durham, N. Car., $1.50 a copy), 8(3), July 1938, pp. 348-436, 28 figs., 5 tables.

This report includes fairly detailed descriptions of the climate, history, vegetation (including successions and their principal plant components and animal inhabitants), and seasonal changes, as observed on a 500-acre tract, embracing the Kellogg Bird Sanctuary and adjacent territory in Kalamazoo County, Michigan. So far as practicable the animal populations were censused by a variety of methods which are described and the results are given for the principal species for the two years and also discussed and summarized. The principal larger mammals and birds treated are the cottontail, fox squirrel, skunk, pheasant, and quail. Animal inter-relations are discussed for the different associations and seasons, with emphasis on food relationships. There is a summary, extensive bibliography, check-lists of the vertebrates of the farm, and a table showing the abundance and availability (November-March) of fruits and seeds.

The following extract is from the author's summary. "It is evident from this study that relatively dense populations of three species of large mammals have existed here together. The cottontail rabbit, the skunk, and the fox squirrel are abundant, and there is no apparent reason why they should not continue to thrive. Six species of small mammals are also particularly plentiful. The spermophile, prairie deer mouse, meadow mouse, white-footed mouse, short-tailed shrew, and prairie mole evidently find this farm a very favorable habitat.

"Among birds the number of pheasants is low. The species has been conspicuously preyed upon by the Cooper hawk, but perhaps no more here than elsewhere. The drop in numbers from late fall to spring has been less than one-third, but the productivity of the breeding stock has been low. Evidently about one-third of the nests of pheasants are broken up by natural enemies. It is, however, not certain that the status of the bird can be attributed in any large measure to this factor, as such a proportion of nest losses may occur even in favorable areas. The exact ways in which this environment is limited for pheasants have not been definitely established.

"The large amount of cover makes this farm favorable to pheasants, rabbits, and other species in severe winter weather. The area also has been prolific of natural food supplies which supported large numbers of winter songbirds and other animals. The flora is very favorable to herbivorous species and hence the large, though probably not abnormal, numbers of small mammals found here are to be expected. It follows from this that the carnivorous species dependent upon the latter should also find the farm a favorable habitat. This is notably so in the case of the skunk; and the numbers of the weasel, cat, marsh hawk, redtail, horned owl, crow, and other carnivores are apparently about 'normal' for these species.

"On this area of farm land we have, in general, copious food supplies and abundant cover. The animal populations are characterized by large numbers of rabbits, squirrels, and skunks, but small numbers of pheasants. A knowledge of the consistency with which these relative numbers do or do not occur on other areas will throw further light upon the extent to which each of these species tends to determine the status of others."

An interesting report on 2 years of evidently careful work. Whenever possible, however, such studies should be carried on long enough to cover at least one complete population cycle of the principal wildlife species concerned.

Ecology: Lake surveys, Wisconsin

Bordner, John S. et al. Lake survey data. Douglas County, Wisconsin, 10 pp. Sawyer County, Wisconsin, 14 pp. Mimeographed. 1938. (Division of Land Economic Inventory, Capitol, Madison, Wis.)

Notes on lake study including the effects of seasonal changes in temperature, periodic variations in water level, mineral nutrients, role of plant life, and possibilities for improvement. Tabulated information about lakes relates among other things to location, accessibility, area, depth, condition as to outlets, character of water, and presence and abundance of fishes and plants.

Ecology: Populations, crow roosts, New York

Emlen, John T., Jr. Midwinter distribution of the American crow in New York State, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.50 a copy), 19(2), April 1938, pp. 264-275, 3 figs., 3 tables.

Difficulties in censusing are discussed; the history of crow roosts in New York is traced; ecological factors including climate, physiography, soil fertility, enemies, cover, and food are treated in relation to roosts. Author's summary: "(1) Total of 225,000 crows were present on 20 wintering territories in New York State during the winter of 1932-33; (2) the boundaries of these territories have not changed appreciably in the past half century or more; (3) there is no evident correlation with any current ecological factor investigated. Territory boundaries coincide more closely with the original distribution of the 'southern hardwood forest' than with existing vegetational cover; (4) the winter range of the crow in New York State may possibly be delimited by an innate 'homing' factor established in the past in the birds of each population unit under primitive ecological conditions, and handed down essentially unaltered, through the recent decades of extensive habitat change." Bibliography of 27 titles.

Ecology: Populations, wren-tit

Erickson, Mary M. Territory, annual cycle, and numbers in a population of wren-tits (Chamaea fasciata), Univ. Calif. Publ. Zool. (University of California Press, Berkeley, Calif.), 42(5), pp. 247-334, pls. 9-14, 16 figs., 5 tables, 1938.

The wren-tit's possession of territory is continuous and the bird may occupy the same territory for successive years. Defense of territory is formalized consisting of vocal threats and posturing and rarely deserves to be called fighting. The average size of territories was .8 acre. They do not appear to be regulated by quantity of food of which there is an excess. On the average 4 eggs are laid and there is only one brood a year. Voice, food, roosting, and preening are rather briefly discussed and there are summaries relating to territory, population, and life-history.

Ecology: Wildlife in forests

Haig, I. T. Forest wildlife and silviculture, Science (Lancaster, Pa, 15 cents a copy), 87(2265), May 27, 1938, pp. 485-487.

There is much discussion of how forests affect wildlife but not of the reverse, a deficiency this paper to some extent repairs. Silviculture is concerned with all things affecting the welfare of forests, and among these certain forms of wildlife are important, especially in relation to tree reproduction. The consumption of seeds by squirrels is a controlling factor in conifer reproduction in the Southwest. These animals as well as several kinds of birds destroy both seeds and seedlings and may get the entire crop produced by pines having the larger kinds of seeds, thus giving smaller-seeded species preponderance in regeneration stands. The seed-eaters have to be taken into consideration in planting operations and often excluded or destroyed to insure success. In conclusion the author writes: "The study of the animals themselves, their life habits and so on, are of course primarily the task of the forest biologist. Some of the questions which the silviculturist must put to the biologist are: (1) What are the important forest-inhabiting animals and birds affecting forests and forest practices? (2) What is their life cycle, their food habits, etc.? (3) What effect will the destruction of other animals, including predators, have on them? (4) How are they affected by environmental changes which the silviculturist may make--as through clear cutting, etc.?

"The forester must have the answer to these and similar pertinent questions before satisfactory forest-cutting practices can be worked out in silvicultural terms."

Ecology: Wildlife in tree planting

Ridley, H. N. Nature's tree planters, The Tree Lover (Council for the Preservation of Rural England, 4 Hobart Place, London, S. W. 1, England, 3 shillings a copy), 2(23-24), Spring and Summer 1938, pp. 196-197.

Wild cattle and swine; deer, squirrels, rook, jay; role and importance in planting.

Ecology: Wildlife range essentials

King, Ralph T. The essentials of a wildlife range, Journ. Forestry (Mills Bldg., Washington, D.C., 50 cents a copy), 36(5), May 1938, pp. 457-464.

A closely reasoned exposition, the analytical framework of which is about as follows: A wildlife management program should include inventory, census, yield determination, diagnosis, and control. Inventory determines the species present and their distribution, not only of the animals to be managed but also of their food and cover plants, and competitors. Censusing relates to quantities and also should be broadly inclusive; interspersion and juxtaposition of environmental elements are part of this field. Yield determinations involve the annual productivity of all factors. Diagnosis determines whether wildlife populations are, or are not, as they should be; essential steps are (1) recognition of the factors operating against the various species, (2) evaluation of the effects of these factors, and (3) identifying limiting factors. Control measures consist for the most part of modifications of the environment.

Environmental factors embrace essentials and non-essentials; the latter may be recognized but in practice ignored. Essentials are the entities, foods, coverts, and water resources, and their patterns, juxtaposition, and interspersion. Home range for any creature must contain all of the species requirements for both sexes and all age classes for all seasons and for all of the animal's activities. Even if all requirements are present, they do not constitute habitable range unless they are distributed in such a manner that every one of them occurs within the cruising radius of the animal concerned. Carrying capacity does not depend solely upon available quantities of resources but also on their interspersion so that they will serve the varying units of range as determined by specific population saturation levels. Maximum productivity can be attained only when all essentials are at optimum.

Economics: Value of fur animals, Pennsylvania

Morton, J. N. Fur bearing animals add to farm income, Pennsylvania Game News (State Game Commission, Harrisburg, Pa., 10 cents a copy), 9(4), July 1938, pp. 14, 32, 1 photo.

Average annual value more than a million dollars. Muskrat, skunk the most important species; notes on their foods, habitats, and conservation. Sketch of the bounty system under which more than $100,000 is paid out each year. Most of the income from trapping and bounty goes to farm families.

Economics: Value of muskrats, New Jersey

Harris, Earl S. Muskrat culture and its economic significance in New Jersey, Proc. 24th Ann. Meeting N. J. Mosquito Extermination Association (Agricultural Expt. Station, New Brunswick, N. J.), 1937, pp. 20-24, 6 figs.

Of 4 types of marsh available in New Jersey, the banked fresh-water meadow is most productive of muskrats and probably also is the most troublesome from the standpoint of mosquito control. Channels made by muskrats, however, are an aid in that work. Muskrats and their staple foods decrease in proportion to salinity of the water. The most important food plants are

of the genera Scirpus, Spartina, and Typha. Tide marshes will yield yearly about 3, and banked meadows about 6, muskrats to the acre. Annual receipts from the industry for the State average about three quarters of a million dollars.

Food Habits: Arctic birds and mammals

Cottam, Clarence, and Harold C. Hanson. Food habits of some arctic birds and mammals, Field Museum (Chicago, Ill.), Zool. Series, 20(31), June 1938, pp. 405-426.

Report on species observed on the Bartlett Expedition of 1936 to Newfoundland, Labrador, and Greenland, including field observations on occurrence, habits, and food and laboratory analyses of the contents of collected stomachs. Twenty-three species of birds and 8 of mammals are discussed.

Food Habits: Beaver

Atwood, Earl L., Jr. Some observations on adaptability of Michigan beavers released in Missouri, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 165-166.

Beavers transplanted in 1928 and 1929 throve and spread to a distance of 80 miles. Due presumably to the swiftness of headwaters the movement has been entirely downstream. Cornfields, sources of both food and dam material, appear to have been an important factor in fixing the location of colonies. Natural foods (17 kinds listed) also are well utilized. The number of cuttings is proportional to the abundance of the plants within 100 feet of the stream bank.

Food Habits: Bird consumption of pine seeds

B.[urleigh], T. D. Bird damage to longleaf pine reproduction, Southern Forestry Notes (Southern Forest Expt. Sta., New Orleans, La.), 22, May 1938, p. [3], mimeographed.

In good seed years birds are attracted in numbers and are responsible for much of the losses of both seeds and seedlings. In years of scanty seed production not so many birds are present and losses are negligible. Meadowlarks, blackbirds, bobwhites, and mourning doves are important pine seed consumers.

Food Habits: Buteo hawks

Errington, Paul L., and W. J. Breckenridge. Food habits of Buteo hawks in North-central United States, Wilson Bul. (Sioux City, Iowa, 50 cents a copy), 50(2), June 1938, pp. 113-121.

Data chiefly from stomach examination as pellets do not yield very satisfactory information. The extent of carrion feeding is discussed. The findings are discussed by species and regions, the red-tailed, red-shouldered, broad-winged, Swainson's, and rough-legged hawks being treated. This is essentially a contribution of facts toward appraisal of the food habits of the birds concerned and already is so concise as not to be readily summarized. Availability is recognized as a prime factor in food gathering. "What a red-tail or any other Buteo eats is largely a matter of what is to be had without too much trouble."

Food Habits: Coyote

Soulen, Garrett H. Food habits of the coyote, Minnesota Conservationist (State Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 58, June 1938, pp. 20, 27-30, 32, 1 photo.

A compilation including testimony both for and against the coyote, and summarizing food habits reports. Author's summary: "Thus we see that investigations by scientists and experts show that when the problem of coyote control based on his food habits is attacked on a broad basis and without undue stress being placed on conditions in certain localities, the results certainly favor the conservation of the coyote. On the other hand cattle raisers and especially sheep raisers wish to see a policy of complete extermination carried out. Undoubtedly both sides have rights to their convictions, but certainly, complete annihilation or a policy of complete protection would disturb the balance of nature. Therefore, let us choose a middle path; control the coyote in sheep-raising districts, but only to a limited extent, and in others leave the problem of control to local hunters who are generally well able to cope with the situation."

Food Habits: Elk browse

Greffenius, R. J. Results of the Copper Ridge Basin elk study, U. S. Forest Service Rocky Mountain Region (Denver, Colo.), Bul. 21(4), April 1938, pp. 14-15, mimeographed.

Studies on the Routt National Forest showed that in the order of plants browsed in proportion to the total present, mountain ash, mountain balm, serviceberry, chokecherry, and scrub oak were the favorite foods of the elk. Considering the quantity of each available in connection with preference ratings, it was judged that in value as providing winter sustenance the plants studied should be ranked as follows: serviceberry, scrub oak, chokecherry, mountain ash, mountain balm, willow, hawthorn, mountain maple, and aspen. 86 percent of the browse is supplied by the first four of these plants. The range is under- rather than over-stocked.

Food Habits: European partridges

Anon. The foods of adult partridges, I. C. I. Game Researches (Imperial Chemical Industries, Millbank, London, England), Advisory Leaflet 16, 7 pp., and folded insert containing 2 tables of food percentages and frequencies and a colored chart showing seasonal percentages of foods. March 1938.

This is a summary of the paper by Middleton and Chitty abstracted under the same heading in WILDLIFE REVIEW, No. 13, March 1938, p. 7, with addition of the graphic matter noted in the reference.

Food Habits: European partridges

Collinge, Walter E. Food of the partridge, Nature (St. Martin's St., London, W.C. 2, England, 1 shilling a copy), 141(3575), May 7, 1938, p. 834.

Referring to the paper by Middleton and Chitty abstracted in WILDLIFE REVIEW, No. 13, March 1938, p. 7, Dr. Collinge suggests that the reason for the great discrepancy in bulk proportion of insect food reported by him in 1917 (40.5%) and that stated by the authors reviewed (2.5%) is an actual change in food habits such as he avers has also occurred in the case of the rook and the starling in about the same period. He further suggests that the change has not been beneficial as the partridge in recent years has suffered great losses from strongylosis and coccidiosis.

Comment. The fact that Middleton and Chitty examined only crop contents explains in part the different results reached as to proportions of insect food as the hard parts of insects are known to accumulate in gizzards. They say, "There is no reason to doubt that the crop contents alone form a truly representative sample of the food eaten. As there is no evidence to suggest that some food items pass more quickly than others from the crop to the gizzard, it may be safely assumed that the material found in the crop of a partridge at death x x x is the food taken a short time before."

That there may be a fallacy here is indicated by a paper by Swenk and Selko on food of the sharp-tailed grouse (manuscript) as these authors repeat for plant after plant (of which both seeds and leaves occurred) that no leaves were found in the gizzards, no seeds in the crops. The suggestion is that seeds may go direct to the gizzard. Gizzards are known to have differential powers of retention with respect to grit and there may be phenomena with respect to the flow of food from crop to gizzard with which we are unacquainted. The contents of gizzards and crops are sometimes mixed, possibly due to convulsions associated with a violent death struggle.

Food Habits: Horned toads

Knowlton, George F. Horned toads in ant control, Journ. Economic Entomology (450 Ahnaip St., Menasha, Wis., 75 cents a copy), 31(1), Feb. 1938, p. 128.

Summary of the stomach contents of 51 Phrynosoma douglassi ornatissimum and 52 P. platyrhinos from Utah, ants predominating in both cases. A nearly mature individual of the second species was observed to eat 89 harvester ants (Pogonomyrmex occidentalis) in an hour.

Food Habits: Owls

Wilson, Kenneth A. Owl studies at Ann Arbor, Michigan, The Auk (3200 22nd St. N., Arlington, Va., 75 cents a copy), 55(2), pp. 187-197, 1 fig.

Notes on traits, ecological relationships, and food habits (from study of pellets) of 5 species of owls. Discussion of weathering of pellets, and relationship of the owls to songbirds and to mammals.

Food Habits: Sciurus aberti ninus

Coughlin, Louis E. The case against the tuft-eared squirrel, U. S. Forest Service Rocky Mountain Region (Denver, Colo.), Bul. 21(4), April 1938, pp. 10-12, mimeographed.

Sciurus aberti ninus, for which several vernacular appellations are given, is numerous among ponderosa pines in and near the San Juan National Forest. General behavior is sketched and food habits emphasized. The squirrels cut off the tips of branches of the pine and strip bark from 3-7 inches of the stubs; bark from branches up to 3 inches in diameter also is eaten. The damage is termed serious and is said to have largely escaped identification by being confused with porcupine work; the latter is not important. The squirrels also consume large quantities of pine seed, eat seedlings, and destroy the eggs and nestlings of birds which benefit the trees.

Food Habits: Short-eared owl

Snyder, L. L., and C. E. Hope. A predator-prey relationship between the short-eared owl and the meadow mouse, Wilson Bul. (Sioux City, Iowa, 50 cents a copy), 50(2), June 1938, pp. 110-112, 2 tables.

Analysis of a long series of records shows that the short-eared owl, while at times numerous in the Toronto, Ontario region, at others is scarce or absent. Attention being directed to the birds during a period of great abundance of field mice, investigations were made of more than a thousand pellets. In percentage of animals represented in the pellets, meadow mice stood at 71.7 and deer mice at 27.3. The following year when the abundance of voles was reduced, 252 pellets were examined and the comparable percentages found to be 93.7 and 5.3. Interpretations of these results are suggested; one is that predators feeding heavily on a population of plague proportions were a factor in reducing it before the next breeding season.

Food Habits: Skunk

Wight, H. M. Food taken by the eastern skunk (Mephitis m. nigra) with particular reference to birds and eggs, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(3), June 1938, pp. 12-13, 30, 2 photos, 1 graph, 1 map, 1 table.

Brief review of 4 titles from the extensive previous literature. Account of the Northville, Michigan, project begun in 1928 in which an effort was made "to become as intimately acquainted as possible with each skunk den and its occupants." The food analyses were based on feces and are tabulated both numerically and volumetrically. In both senses the percentages of bird remains is relatively low, 0.7 to 8.0, except in a single locality where the percentages were very high (73 and 77) due chiefly to the availability of dead poultry thrown in a barnyard. The records for dens and groups of dens are discussed and the findings indicate "that the skunks inhabiting the 78 dens investigated, seldom, if ever, killed birds." Special care was taken to segregate and identify fragments of eggshells. They were found in 17.7 percent of the samples from 14 percent of the dens. Hen eggs were identified in 30 cases, those of quail in 2, pheasant 1, crow 1, and small birds 9. Most of the hen eggs apparently did not represent depredations. Small bird nests are not more frequently raided because they are discovered only by chance in the skunks characteristic method of hunting. Birds, especially the larger ones, may be able to drive skunks away from their nests. "There is much evidence to indicate that the skunk is not a natural egg-eating animal." If control is necessary, only offending individuals should be eliminated. The food-graph shows the bulk of the food of the skunks to be insects, with mammals, mostly mice, second, and grains and fruits third, in importance.

Life Histories: Beaver

Bradt, Glenn W. A study of beaver colonies in Michigan, Journ. Mammalogy (Wm. H. Burt, University Museum, Ann Arbor, Mich., $1.00 a copy), 19(2), May 1938, pp. 139-162, 1 fig., 7 tables.

Report on research since 1929 as a basis for management by the Game Division of the Michigan Department of Conservation. Notes on trapping by an improved aluminum alloy live-trap, and on handling and transporting beavers; identification of sexes; and marking the animals by tagging and branding their tails. A careful study of the numerical composition of 57 beaver colonies gave an average of 5.1 animals per colony. The number is not closely correlated with those of lodges, bank burrows, or dams. The "typical" beaver colony consists of two parents, yearlings, and kits of the current year. The sexes exist in about equal numbers; there is a single litter of 3 or 4 young. The most important foods are aspen, maple, and willow, but a great variety of plants are sampled, and aquatics are consumed to a considerable extent in summer. "The beavers studied cut between 200 and 300 trees each per year. One acre of poplar (aspen) should support an average beaver colony from 1 to 2.5 years, depending on circumstances. Yearlings are permitted to remain in the colony, but the two-year-old beavers leave or are driven from the home colony shortly before the birth of the second annual litter. Beavers do not always follow water courses during emigration, but may undertake long overland journeys. The emigration of the two-year-old beavers provides a method of dispersal, and tends to establish new colonies in areas not previously stocked with beaver. The size and composition of beaver colonies is such as to permit the efficient and economical use of food supplies adjacent to small bodies of water." Bibliography of 16 titles.

Life Histories: Coot

Friley, Charles E., Jr., Logan J. Bennett, and George O. Hendrickson. The American coot in Iowa, Wilson Bul. (Sioux City, Iowa; 50 cents a copy), 50(2), June 1938, pp. 81-86.

After many trials, some disastrous, it now appears that a good many of the lakes, marshes, and potholes of Iowa are safe from drainage and will be available indefinitely for occupation by waterfowl. Coots are numerous both as migrants and breeders. The authors' observations permit remarks on habitat ecology, and the effects of changes in it, nesting and factors affecting it, number of eggs, hatch, habits of young, and relation of the coots to predators and to other associated species.

Life Histories: Coyote reproductive cycle

Hamlett, G. W. D. The reproductive cycle of the coyote, U.S. Dept. Agr. Technical Bul. 616 (Supt. of Documents, Washington, D. C., 10 cents a copy), 11 pp., 2 pls., 2 figs., 1 table, July 1938.

Report on a histological study of testes and ovaries collected at all seasons combined with a summary of field notes on breeding and on numbers of young in dens. The coyote has a definitely limited breeding season that is somewhat longer, however, in males than in females. Production of more than one litter in a year is highly exceptional. The period of gestation is 60-63 days, the average number of embryos in pregnant females 6.23, and of young in dens 5.7.

Life Histories: European moose

Kostron, Karel. The European moose-deer [Alces alces (L.)] of Poland, East Prussia, and Baltic Lands, Institut National Agronomique Brno (Cerna Pole, Brno, Czechoslovakia) Bul. 1938 (D 25), 99 pp., 31 figs.

This report is in the Czech language, with headings and legends of figures rendered also in Polish and English. The paper is evidently comprehensive and written from the management point of view. Knowing nothing of the Czechoslovakian language, the English wording noted and the figures enable the abstracter to give some idea of the contents of the article.

The classification of moose and their paleontologic and recent history are sketched, including the progressive restrictions in range of the European species in response to human influences. The postwar status of the moose population is given in considerable detail and all of the distributional studies are accompanied by maps. The present range is closely defined and mapped, the location of refuges being a feature of this section. There is a general anatomical description and discussion of variability and races of moose. The principal division of the report--on biology--gives an account of birth and growth of young, food (including scientific names of food plants), and antlers and their development. This last division is in considerable detail, probably

as being of importance in connection with hunting. The interesting point is made that development of the antlers is in inverse proportion to the "bell", the latter being more prominent in younger, and less noticeable in older, males. The biology section goes on to consider movements and spoor and shows that both the tracks and dung of the sexes can be distinguished. There are remarks on the sociology, and on the mental qualities of the animals and a discussion of their predators and parasites. Ecology, including reactions to people and to hunting, protection and restoration (including selective killing and other methods of improving the race) are concluding chapters. There is a bibliography of 149 titles.

Life Histories: European partridge

Green, Wm. E., and George O. Hendrickson. The European partridge in North-central Iowa, Iowa Bird Life (Winthrop, Iowa, 15 cents a copy), 8(2), June 1938, pp. 18-22, 1 fig.

General account, chiefly compiled, but including original Iowa data on population density, winter hardiness, range preferences, and nesting.

Life Histories: Mountain lion

Hibben, Frank C. A preliminary study of the mountain lion (Felis oregonensis [sub] sp.), University of New Mexico (Albuquerque, N. Mex., 50 cents a copy), Bul. 318, 59 pp., 1 map., tables, Dec. 1937.

Report on a cooperative investigation in New Mexico and Arizona lasting one year, the observer accompanying hunters of the State Game Departments and of the Biological Survey. Lions are hunted at the request of stock associations; 30 of 32 reports "were false; in the other two, we caught the lions." Treating the species as a game animal may sometime conciliate conservationists and sportsmen and also exert sufficient control, but that appears to be something for the future. Mountain lions seldom show aggressiveness toward man. The bulletin discusses habitat, movements, voice, scent stations, breeding, dens, and food habits. Not much evidence of feeding on domestic stock was found; the great bulk of the food was composed of deer, white-tail and mule deer in about equal proportions. The author made an effort to test the claim that predators get largely defective individuals of their prey species and his results seem to favor that hypothesis. Analysis of a considerable number of scats gave frequency indices as follows: mule deer 54, white-tail 28, porcupine 5.8, cottontail 3.9, jack rabbit 2, domestic cow 1.6, and miscellaneous 4.7 percent. There is discussion of the food animals mostly according to specific groups. There is a bibliography.

Life Histories: Muskrat

Smith, Frank R. Muskrat investigations in Dorchester County, Md., 1930-34, U. S. Dept. Agr. Circ. 474 (Supt. of Documents, Washington, D. C., 10 cents a copy), 24 pp., 6 pls., 3 tables, May 1938 (July).

Section headings effectively tell the scope of this much-needed careful investigation; they are: systematic position and range, description, color variation, disposition; muskrat marshes and their population, effects of floods, drought, and cold; sex distribution; activity on the marshes, suspended breathing, burrow and house construction, canals, trails and tunnels, defecating posts; food habits, feeding platforms, vegetable and animal foods; breeding habits, the season, gestation period, size of litters, young; and predators, parasites, and diseases. Bibliography of 23 titles.

Life Histories: Pine mouse

Hamilton, W. J., Jr. Life history notes on the northern pine mouse, Journ. Mammalogy (Wm. H. Burt, University Museum, Ann Arbor, Mich., $1.00 a copy), 19(2), May 1938, pp. 163-170, 3 photos.

Notes on measurements, weights, molts, burrows, nests, habitat, food, reproduction, numbers and their fluctuations, and enemies, parasites, and diseases. Bibliography of 14 titles.

Life Histories: Pocket mice

Scheffer, Theo. H. Pocket mice of Washington and Oregon in relation to agriculture, U. S. Dept. of Agriculture Technical Bul. 608 (Supt. of Documents, Washington, D. C., 10 cents a copy), 15 pp., 5 pls., 1 fig., 3 tables, March 1938 (May).

The mice of the genus Perognathus reported on are strictly vegetarian and sometimes do noteworthy damage to seed plantings and to ripening grain. Besides data on food habits and economic status, information is given on distribution and habitat, physical characters, disposition, daily and seasonal movements, shelters and burrows, breeding habits, and natural enemies.

Life Histories: Sea otter

McLean, D. D. Southern sea otter on Pacific Coast, Associated Sportsman (950 Pacific Bldg., San Francisco, Calif.), 5(5), May 1938, pp. 6-7, 2 photos.

Decline in population on the California coast, an estimated 200,000 having been killed between 1786 and 1868. About 1890 they became so scarce that hunting was no longer profitable and for some time thereafter continued to decrease. Localities for recent reports are given, a "large group was discovered below Carmel the latter part of March of this year." [It is to be hoped these can be given protection.] Notes on habits, life history, and value of the fur.

Management: Bears in National Parks

Cahalane, Victor H. National Park Service bear problem, Planning and Civic Comment (901 Unit Trust Bldg., Washington, D. C.), 4(1), Jan.-March 1938, p. 32.

Feeding of bears by tourists has resulted in hundreds of cases of human injuries in addition to much property damage, and in consequence the National Park Service has adopted a regulation forbidding all feeding of bears by visitors to the Parks. Repelling with electric fences, trapping and transfer, and as a last resort, shooting are methods used in the case of bears that become dangerous--as a rule only those spoiled by pampering and thus losing respect for human beings. With public cooperation, the normal relationship will be restored. "Then bears will be bears and not racketeers."

Management: Bobwhite

Wilson, Kenneth A. Quail management in Maryland, Maryland Conservationist (512 Munsey Bldg., Baltimore, Md.), 15(2), Spring 1938, pp. 7-9, 27-29, 1 photo, 5 tables.

Summary of 27 months' experience on a Farm Security Administration project, earlier reports on which have been abstracted in WILDLIFE REVIEW Nos.: 5, Sept. 1936, p. 15; 7, Dec. 1936, pp. 23-24; and 9, July 1937, p. 23. Description of tract and discussion of results as to food habit studies, feed patches, plant transition studies, seed collecting, and consus. The quail population increased 382 percent and the carrying capacity improved to a bird to 7 acres in contrast with the original 1:35 ratio. Population densities are compared for different types of environment. The tables give details of the food habit study and of the census and list quail food plants of different types of soil. The author's summary is: "It was found that: (1) On the Eastern Shore of Maryland submarginal land is especially well adapted to multiple use conditioning because so much of one work dovetails into that of the other. Ditch drainage that creates better forest growing conditions likewise creates livable habitats for quail and other wildlife. Cultivated strips of land that grow food for quail also provide fire protection for the forest. Forest thinnings that release timber trees also release game food-producing trees and shrubs. (2) The provision of good drainage and substantial fall and winter food contributed more than anything else to the present increase of quail. (3) Where optimum escape cover exists, other things being equal, predator control is not necessary. (4) Land cultivation increases the food supply of hawks, owls, and other predators in the form of mice. (5) Plant transition from cultivated land to broomsedge is three years in badly acid soil and four years in clay. (6) From five to six years following broomsedge an understory of panic grasses, paspalums and partridge pea produce some fall and winter food for quail. (7) Well-drained, sandy soil supports abundant quail food-producing legumes, acid soil does not. Partridge pea is the only legume that grows abundantly in acid soil. (8) Partridge pea grows and produces seed equally well in heavy sour soil or light sandy soil; pure stands

produced 330 lbs. of clean seed to the acre. (9) Ninety-two per cent of all the quail lived around cultivated land. (10) The following proportions of submarginal land are capable of supporting a winter population of one quail for each 7 acres: pine and mixed hardwoods, 72 per cent; swamp woodland, 10 per cent; broomsedge field, 8 per cent; brushland, 5 per cent, and fallow land, 5 per cent."

Management: Burning

Conway, Ralph C. Marsh burning, Wisconsin Conservation Bul. (State Conservation Dept., Madison, Wis.), 3(7), July 1938, pp. 9-10.

Fires may destroy much wildlife from deer to fish, reduce winter cover, and change plant succession sometimes unfavorably. "The statement is made that controlled burning is used to improve game range. This is actually the case in some sections of the country but not on all types of cover found there, nor are large blocks of country burned even when fire is considered beneficial. Such burning must be light and be handled by experts. The Wisconsin Conservation Department recommends that as little game cover and food be burned as possible at any time and that when some burning is necessary, that every possible precaution be taken to limit the fire to the area intended."

Management: Erosion control in relation to wildlife

Davison, Verne E. Fitting wildlife into a practical general farming program, Virginia Wildlife (Blacksburg, Va.), 1(9), May 1938, pp. 2, 7, 1 photo.

The need to improve severely eroded areas with vegetation gives opportunity for guidance advantageous to wildlife. Whatever the factors adverse to wildlife may be, they can be at least partially offset by the production and protection of soil-stabilizing vegetation. Year round facilities are required. Often only field borders can be spared for the work but they have the advantages connected with edge and may be important for their length even if not great in area. Lespedeza sericea, a perennial, and the annual Kobe and Korean lespedezas, browntop millet, Bosc's paspalum, and partridge pea recommended for such edge plantings. Suggestions are given also for the improvement of woodland margins, fence rows, terrace outlets, and ponds. Plans for wildlife rehabilitation in connection with erosion control must be simple, practical, and economical.

Management: Farm game

Morton, James N. Wildlife in the farm program, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, Pa., 10 cents a copy), 9(2), May 1938, pp. 4-6, 30, 3 photos; 9(3), June 1938, pp. 4-7, 32, 4 photos.

Recommendations intended to facilitate cooperation between sportsmen and farmers in improving conditions for wildlife on farms. Part 1 shows that much of the game sought by hunters is dependent on farm practices and that there is general opportunity for making farms more productive of wildlife. Good results can be obtained without expenditure merely by refraining from doing things that are detrimental, "such as burning pastures, cutting all growth along fences and gullies, grazing all of the woodlot," and so on. The kinds of cover are defined and there are suggestions on producing food and cover. The value of wildlife and the usefulness of cover in checking erosion and in beautifying the farm are emphasized. The protection of nesting birds during harvesting, principally by use of flushing bars is urged.

Part 2 is devoted largely to suggestions as to planting to produce food and cover, including feed patches. Grazing in woodlots should be restricted or eliminated and damaged woodlots improved by planting or by sparing useful species. Emergency cover of stones, brush, discarded farm equipment, etc., can be installed while the growth of planted coverts is proceeding; numerous suggestions are made. There are sections on winter feeding, on refuge areas, and on the control of cats and dogs. The summary includes a plea for cooperation between sportsmen and farmers.

This material has subsequently been assembled in the form of an attractive 40 page booklet with cover as Bulletin 16 of the Pennsylvania Game Commission.

Management: Fence rows

Edminster, Frank C. The farm fence in wildlife, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 27(2), March-April 1938, pp. 38-39, 45-46, 1 map, 3 tables.

In general, farm fields lack year-round shelter; opportunity for improving cover lies mainly in fence rows. Shrubby fence rows harbor birds of value in consuming insects and weed seeds, act as barriers to soil erosion, serve as windbreaks, and produce wild fruits, some of which are gathered for home use.

"Clean farming" is continued not so much for proved utility as because it is fashionable. Reversing the trend is a problem in education, namely to make it "good form" to maintain hedgerows. Studies of environment in relation to the pheasant population in Seneca County, N. Y. showed that land with shrubby fence rows had materially greater carrying capacity than "clean farmed" areas. Authors are quoted to show similar effects for quail in Texas and California, and the Hungarian partridge in Michigan. Woody vegetation will come into undisturbed fence rows by natural processes, but may well be planted to hasten realization of benefits. Factors that should be taken into consideration in selecting planting material are mentioned under 12 headings and a table suggests woody plants suitable for the Northeastern States; gives information on their moisture and soil tolerances, height, and period of availability of fruit; and mentions kinds of wildlife the plants benefit. Bibliography of 6 titles.

Management: Forest wildlife

Authors. Northern Region News (U. S. Forest Service, Missoula, Mont.), Monthly news sheet, mimeographed.

In most, if not all, U. S. Forest Service Regions, news organs are circulated which often contain items of interest to wildlife managers. Through the courtesy of Evan W. Kelly, WILDLIFE REVIEW has been supplied with nearly a complete set of that for Region 1 from March 1937 to date, from which the following abstracts have been made.

Elk planted on Deerlodge Forest. George M. Fisher. March 1937, pp. 39-40. Seventy-five ear-tagged elk were transported by truck with little loss. The point of particular interest is the agreement between all parties concerned which specifies the maximum number of elk that shall be permitted to live on the area, and vests in the Forest Service discretion in limiting the herd to some other level. The agreement provides also for adjudication of depredations by all parties of interest and for hunting when permitted under the limited license system.

Game salting notes on the Upper Selway. G. W. Case. May 1937, pp. 35-37. A later report on this subject published in The Journal of Wildlife Management is abstracted elsewhere (p. 35) in this issue of WILDLIFE REVIEW. Certain details in the preliminary report, however, may well be cited. The main objectives were to meet the needs of deer and elk for salt and to use the mineral as a control on distribution of the animals in an effort to prevent overbrowsing, summer use of winter range, erosion started by concentrations of animals, and the spread of diseases and parasites. Some 36,000 pounds of salt was distributed during the first season of trial in 100 and 200 pound lots. Ninety-seven elk at one station consumed 200 pounds and probably would have taken more. The experiment resulted in satisfactory decrease in use of winter range and apparently in lessened infestation by ticks, scabies, mites, and throat bots.

Notes on mule deer forage. Robert F. Cooney. May 1937, pp. 38-39. Winter foods on the Beartooth Division of the Custer Forest. Ceanothus velutinus is highly important and apparently very resistant to damage by browsing. Juniper, fir, and sagebrush also are of outstanding value. In March a prickly pear (Opuntia) was freely eaten.

Results of artificial feeding. Richard M. Bond. June 1937, p. 51. Excerpts from his report on bighorn sickness in Glacier National Park to the effect that artificial feeding may result in pauperization, decline in health, spread of disease, and increase in predation.

Comments on artificial feeding. David J. Maclay. June 1937, pp. 51-52. A case in point. White-tailed deer in the Kaniksu National Forest were completely pauperized by artificial feeding. They hung around the feeding grounds, scarcely foraged for themselves, and rapidly lost condition. About 15 percent died of endotoxemia. They were literally killed by kindness and the conclusion is drawn that wild animals should not be artificially fed except as a last resort.

The case of the otter. David J. Maclay. August 1937, p. 34. Studies in the Selway Basin, Idaho, showed the food to consist to a greater extent of aquatic insect larvae and crayfish than of true fishes.

Too many elk. A. B. Hatch. October 1937, pp. 34-35. Summer range is adequate but winter range is deficient in area, and also in variety and quantity of food. Concentration produces unsanitary conditions at licks, brings on a disease through feeding on too coarse browse that causes loss of teeth and death. Losses on the winter range are increasing. The only solution of the difficulty is herd regulation.

Grouse. Robert F. Cooney. December 1937, pp. 29-30. Notes on distribution, number of eggs and young, and causes of mortality of dusky, Franklin's, and ruffed grouse in Idaho. Sheep grazing did not seem unfavorable. Notes on foods of which the most important were grasshoppers, huckleberry leaves, and larch needles.

Elk and deer foods and feeding habits. R. M. De Nio. March 1938, p. 31. Abstract of paper presented at the Third North American Wildlife Conference, February 1938, which will be available in full in the Transactions. The studies on which the report is based were carried on in the winter game ranges of 17 national forests with a gross area of nearly 27 million acres and a population of 109,000 deer and 37,000 elk. Data collected by direct observations in band trailing, clipping and study plots, and stomach-content analyses show that no fewer than 225 forage species are utilized. A total of 447 deer and elk stomach-content samples have been collected in the Region over a period of four years, representing every big game area on the 17 national forests. Of the 447 samples collected, 59 deer and 53 elk stomach-content samples have been analyzed in detail. Those of 53 elk show that December is the month in which the consumption of grasses by elk decreases and that of shrubs and conifers increases. In April shrubs and conifers decrease sharply in the diet and grasses correspondingly increase. In comparing the analyses of the food of 53 elk and 59 deer based on quantity by weight, the consumption of shrubs by deer in winter is 52.53 percent, while that of elk is only 15,46 percent. Conifers taken by deer are 35.61 percent compared to 11.75 for elk, and grasses 3.04 percent for deer as against 56.58 for elk.

A note on marten management. J. A. Parsell. June 1938, p. 25. More males are trapped in the early, and more females in the late, part of the open season. In default of closure, which is recommended, trapping during only the first month of the season as at present defined should be adopted to maintain productivity.

Management: Forest wildlife

Pederson, F. C. The maintenance and development of wildlife as a forest resource, Virginia Wildlife (Blacksburg, Va.), 1(9), May 1938, pp. 6-7, 1 photo.

In praise of forests in relation to wildlife, this article asserts that the forested and wooded lands of Virginia "provide a major part of the habitat for our remaining wildlife, which for the purpose of this discussion includes

upland game birds and those mammals important for food, fur, and hunting. The forest is a favorable habitat for wildlife in Virginia because for practically all species it furnishes the three prime essentials: food, breeding grounds, and protection from enemies and the elements." The paper points out the value to quail of acorns and of the seeds of pines, sweet gums, and of legumes which grow in the woods. "Ruffed grouse and wild turkeys derive a still greater part of their food from the forest." Deer food consists "almost wholly of the products of forest land." Quail require "forest cover." "Except in special areas, hunting and fishing can be coordinated with other forest-land uses without serious conflict." "About 64 percent of the total land area of the State is essentially forest land." Much of this is in private hands so "the problem of wildlife in Virginia must of necessity be primarily concerned with the propagation and protection of game resources on privately owned forest lands." "Adequately managed and protected forests and woodlands contribute so much to wildlife welfare, while forest exploitation and destruction depletes it." "Unfortunately forest exploitation is still the rule x x x more and more wildlife disappears from lands which it once occupied."

Individual land holdings are often too small to afford satisfactory units of management for mobile game, hence cooperative arrangements between groups of landholders are desirable. With State assistance, returns would be facilitated through the collection of fees for hunting privileges.

Comment. All of this sounds orthodox and praiseworthy but everything depends upon definitions of the principal terms involved in the argument. The author defines wildlife as game and fur species. But what are forests? They are popularly understood as rather dense growths of trees and technically defined as "areas whose principal crop is trees."

Now it is well understood among ecologists and wildlife specialists that wooded areas become less inhabitable for wildlife in proportion to their density, that is to the extent that they become real forests. Bobwhite and cottontail are the most important game species of Virginia but they are not forest dwellers. This fact materially reduces the significance of the claim that "the forested and wooded lands of the State provide a major part of the habitat for our remaining wildlife." The claim cited is one frequently made by foresters, but if they have in mind open woodlands and brushy clearings, only to which it can apply, these should be specifically named and the term forest avoided. As a rule tree growths managed for maximum timber production are unfavorable for wildlife.

The author's comments on the value of forests in supplying food for wildlife manifestly apply to open stands. The woodlands where quail obtain pine seeds are of a very open type and must be kept open to remain attractive to quail. The legumes which grow in woodland, while somewhat shade tolerant, are soon suppressed by dense growth; woods burning on quail preserves has as one of its main objects release of these legumes from smothering growths.

True forests, while apparently all cover, do not provide the close-to-the-ground type that is so important to many forms of wildlife. To aver that forest exploitation depletes wildlife is to ignore the effects of lumbering in such States as Pennsylvania and Michigan where great increase in deer (and

presumably lesser creatures) was the response to the extension of clearings, slashings, and burns, and where now forest growth, reducing the habitable area and the food supply, is bringing about by starvation, or causing man to bring about, decrease in the deer population.

The foresters no doubt favor wildlife, they no doubt mean well, but they should not make unsound claims as to forests in relation to the welfare of wildlife nor forget that two things (in this instance trees and wildlife) cannot occupy the same space at the same time. Wildlife must have space, light, ground cover, and in a majority of cases food readily accessible from the ground. Unrestrained, trees kill these things and to assure them, trees must be in places discouraged or eliminated, not everywhere encouraged as the prime crop. This is not to say that wildlife must be favored in a given area, for as the author contends, economic considerations as a rule must control; if wildlife does not promise sufficient returns, it will not be especially encouraged. That situation is admitted but to be equally candid with wildlife proponents, foresters should refrain from implying that forests, as such, necessarily benefit wildlife; the condition may be and often is quite the reverse.

Management: Forest wildlife

Taylor, W. R. Fauna and forestry in Great Britain, Forestry (Oxford University Press, Amen House, E.C. 4, London, England, 7 shillings 6 pence a copy), 11(2), 1937, pp. 81-84.

Review of the effects of man upon the fauna including extirpations, reductions, and introductions. Notes on animal depredations in forests with the comment, "Surely the most rational remedy lies in an attempt to adjust the relative numbers of the helpful predatory species to the non-predatory." Foresters should so regulate the wildlife populations in forests as to be good neighbors; nevertheless, they may save certain threatened species from extinction.

Management: Game and hunting in Finland

Klemola, V. M. Finnish game and hunting, Silva Fennica (Society of Forestry, Helsinki, Finland), 40, 27 pp., 5 maps, 5 tables, 1937.

Account of game species, their distribution, and prevalence. The mallard forms half of the waterfowl population and the black grouse predominates among upland game birds. Species are grouped as they are attracted or repelled by cultivation and other human activities. The brown hare and partridge, both newcomers, are most important among game species favored by cultivation, and the ptarmigan, capercailzie, and hazel grouse among those driven away. Rational hunting is not destructive to the fauna but unfortunately most of the hunting, both past and present, is irrational and constitutes plundering of the fauna. The record in extermination and near extirpation reads something like that of the United States--the beaver extinct, and the marten, lynx, otter, bear, wolf, and wolverine seriously threatened. The introduced muskrat is spreading despite intensive trapping. It is regarded

as an economic asset, however, not as something to be destroyed as in Great Britain. Game zones, correlated with vegetation and climate, and their inhabitants are discussed in some detail. Methods of hunting both primitive and modern are described. The harvesting of game and fur as an economic factor was of decisive importance in earlier times and is still depended upon to some extent, although game on the whole has greatly decreased. Statistics are given on the take of fur animals including in a Table the number of individuals of 6 species reported in representative years since 1880. [When the take can be so stated in numbers of 55 or under as for 4 species (bear, wolf, lynx, and wolverine) in all years since 1920, it would seem that the animals concerned are near extinction.] The bag of game birds, itemized for 1933-34, seems very large. The monetary value of game is estimated at from 30 to 40 million Finnish marks ($756,000-$1,008,000) annually. The State compensates for damage by bear and elk and pays bounties on several fur animals, the bulk of the total amount for seals. Private organizations for game protection are growing in importance. Under a law of 1934, fees paid by members to the State are expended for game preservation. Members are entitled to hunt only in areas for which they have permits. The work of the associations (about 200 in number) is conducted by local boards, which have the cooperation of advisors associated with an inspector of hunting in the Ministry of Agriculture. The present game laws are described and their prohibitions and closed seasons tabulated. Six mammals and 7 birds are given total protection. The general text of the article abstracted is in English and a summary in Finnish.

Management: General

Anon. North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh, N. Car.), 2(6), June 1938, 14 pp., 6 figs.

Brief general account of the ruffed grouse with argument from cyclic fluctuations for discretionary game regulation by the departments of conservation. An essay entitled "Wildlife needs action, not words," points out the essential failure of laws, vermin control, refuges, and propagation to check the downward course of wildlife and emphasizes the urgent need of actual field work in improving environment and of getting the full cooperation of landholders. There are also some interesting notes on beneficial food habits of small birds.

Management: Harvesting deer

Hill, R. R. Minnesota's deer problem, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 57, May 1938, pp. 9, 19, 22-23.

In reply to a charge that Minnesota deer are being extirpated by hunting, this article relates to the Superior National Forest and its conclusions are not held to be applicable elsewhere. "Good game management must be based upon facts as they exist in the various areas to be managed." On the Superior Forest the deer population is from 60 to 70 thousand; fawns are about a third of the total, so the annual increment is considered to be about 20,000. Some 12,000 deer die in the winter yards, 4,000 or 6 percent of the total are

removed by hunting, and the remaining 4,000 are unaccounted for. Hunting as at present carried on is not decreasing the herds.

Management: Hungarian partridge in Europe

Swanson, Gustav. The Hungarian partridge, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 57, May 1938, pp. 12, 28-30, 1 illus.

Notes on old-time methods of hunting the species in Europe and on modern systems of management there. The British "Euston system" essentially one to give additional protection to the eggs, and the French pairing and feeding methods for improving egg production, are described.

Management: Miscellaneous

Anon. State of New York, Conservation Department (Albany), Twenty-seventh Annual Report. For the year 1937 (1938).

Pages 261-298 assigned to the Bureau of Game and 298-302 to the Bureau of Game Refuges are of most interest to wildlife managers. A great deal of the former section is devoted to research but the miscellaneous character of the report in general makes advisable its allocation to a "Management" heading. Among inclusions is the 8th report of the New York Ruffed Grouse Investigation. Food habit investigations were stressed. Grasses and sedges were found to be leaders among vegetable foods of the chicks and also of adults in summer and fall, and equally unexpectedly popple at the bottom of the list of the first ten winter staples. Tables name the ten ranking food plants for each season and the parts of the plants most commonly used. [The words "preferred" and "unpalatable", used in describing certain foods, are, as a rule, inexact. To a great extent, abundance and availability rule food consumption. The factor of familiarity also should be considered as birds often do not take readily to unaccustomed foods although upon further acquaintance they may accept them freely.] Cyclic phenomena were of mixed import; reproductive potential and sex ratio have continued about the same as in previous years. Apparent correlation between grouse declines and certain weather conditions is indicated but not definitely accepted as a cyclic factor. There is discussion of mortality among nestling, broodling, and adult grouse, and of diseases and parasites, none of serious importance. Pathological examinations of wildlife are tabulated to show the groups and individuals (1635) autopsied, and the causes of death. A table of post-mortem findings of both adult birds and chicks from game farms and another of wild deer also are given. The principal parasites and diseases are briefly discussed. Developments in the experimental propagation of grouse, pheasants, and ducks are described. Deer studies, game habitat surveys, planting of food and shelter trees and shrubs, slashings in relation to forest wildlife, a feed patch seed mixture, propagation, restocking, the take of game and fur, and the development of refuges also receive attention.

Management: Miscellaneous

Anon. North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh, N. Car.), 2(5), May 1938, 14 pp., 3 figs.

Colonization of 3,000 acres of marsh in Currituck County, N. Car. with "black" muskrats from Maryland; experimental forced feeding of seeds of Cassia tora resulted in diarrhea in bobwhites, and diarrhea and death in an English sparrow; white rats and cotton rats refused the seeds when proffered alone or mixed with other foods; after 10 days of soaking the softened seeds were eaten by cotton rats; several instances are given of the value of birds in locally controlling insect pests--quail vs. bean leafbeetles and potato beetles; blackbirds vs. plant lice; crows vs. tobacco worms and cutworms; notes on reasonable control of blue darters and on damage done by roaming dogs.

Management: Otter

Yeager, Lee E. Otters of the delta hardwood region of Mississippi, Journ. Mammalogy (Wm. H. Burt, University Museum, Ann Arbor, Mich., $1.00 a copy), 19(2), May 1938, pp. 195-201, 1 table.

Description of region; history of otter capture, including a table showing methods of taking of 169 individuals; notes on den trees and dens; habitat preferences; reactions to floods; management by protection, stream and lake bank protection and restoration, and conservation education.

Management: Planting for wildlife; hawthorns

Deck, Raymond S. The hawthorn--friend of the sportsman, Country Life and The Sportsman (Philadelphia, Pa., 50 cents a copy), 74(1), May 1938, pp. 72-73, 130-133, 5 photos.

A popular article embodying information on the value of Crataegus in providing food and cover, with special notes on a few species with persistent fruits.

Management: Range

Cully, Matt. Grazing habits of range cattle, The Cattleman Coliseum Bldg., Fort Worth, Texas), 24(9), Feb. 1938, pp. 19-23, 3 photos, 1 table.

Remarks on preferences among food plants and the table summarizing them in convenient form may be useful to those faced by problems of competition between cattle and wildlife.

Management: Range

Hatch, A. E. Stockmen, sportsmen to cooperate, National Wool Grower (509 McCormick Bldg., Salt Lake City, Utah), 28(5), May 1938, pp. 9-11, 2 photos.

Stockmen are worried about the consequences of the Federal Aid to Wildlife Restoration Act. The author thinks that differences between the cattlemen and sportsmen are more imaginary than real and believes that with a little conciliation from each side, both wildlife and livestock will benefit. At present the Forest Service controls most of the summer range and the stockmen about 95 percent of winter range suitable for game. Wildlife can be brought

back in satisfactory numbers without injury to livestock and it is the task of the stockmen to convince sportsmen of this fact. On the other hand, wildlife restoration, as in the case of the beaver, for instance, through protection of water supplies, will benefit the livestock industry. Conservation and development of watering facilities in arid districts will be a boon both to wildlife and domestic stock.

Management: Salting to localize big game

Case, George W. The use of salt in controlling the distribution of game, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 79-81, 1 fig.(map), 15 tables.

Notes on natural licks in the Clearwater Basin, Idaho and on experiments in salting. It was found possible to detain elk and deer on summer pastures and thus protect depleted winter range. Tests revealed that the animals utilize salt to which certain strong flavors were added and this is thought to show that medication to control parasites and diseases may be feasible.

Management: Stocking

Grimmer, W. F. 1938 experimental game birds, Wisconsin Conservation Bul. (State Conservation Dept., Madison, Wis.), 3(6), June 1938, pp. 3-6, 1 photo.

Notes on work with several kinds of game birds of which Mongolian pheasants have been extensively, and chukar partridges locally, established. Work with other forms farthest advanced involves the melanistic mutant of the ringneck pheasant, a cross between the Japanese green and English blackneck pheasants, Reeves, and the Nepal Kaleege pheasants.

Management: Stocking muskrats

Storer, Tracy I. The muskrat as native and alien: a chapter in the history of animal acclimatization, California Fish and Game (Ferry Bldg., San Francisco, Calif.), 24(2), April 1938, pp. 159-175, figs. 57-62.

Reprint with considerable additions of the article "The muskrat as native and alien" abstracted in WILDLIFE REVIEW, No. 11, February 1938, p. 29.

Management: By the TVA

Richards, Edward C. M. The future of TVA forestry, Journ. Forestry (Mills Bldg., Washington, D. C., 50 cents a copy), 36(7), July 1938, pp. 643-652.

The author resigned as head of the Forestry Division of the TVA after serving from the beginning, a period of about 4-1/2 years. He "criticizes certain policies and the lack of others by the Board of Directors, while upholding the work in forestry, soil erosion control and wildlife management has been done." A section of the paper amounting to somewhat more than ges is devoted to "Wildlife Management and Fisheries." The author says

that, "The TVA has only agreed to do anything at all for wildlife and fisheries because of strong pressure. In order to 'shorten the power yardstick' and show that its power program is a sound, profit-making business enterprise, it is trying to cut expenses, especially permanent operating expenses. Outside and inside pressure insist upon the wildlife work, however. The TVA consequently does as little of it as possible; just enough to east that pressure." There are other remarks on evasion of obligations in research and management that will be of interest to readers of WILDLIFE REVIEW.

Management: Trapping deer

Ruff, Frederick J. Trapping deer on the Pisgah National Game Preserve, North Carolina, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 151-161, 1 pl., 4 figs.

Author's abstract: "Trapping adult deer on the Pisgah National Game Preserve was initiated in 1928 in order to obtain deer for restocking purposes, and incidentally to help reduce increasing numbers. The trap is, in many respects, similar to ordinary cage- or box-traps used in live-trapping, with the added feature of holding an animal in comparative darkness. Materials for construction, cost between $15 and $16, plus $2 for materials for the shipping crate. The 164 traps set in clearings between October 1, 1937 and April 15, 1938, where they were readily accessible by motor roads, netted a total catch of 253 deer. Two men were able to operate from 60 to 75 traps, including the crating of captured animals, setting traps, and baiting with apples and rhododendron sprigs. Crated animals were shipped by rail or truck. Losses due to trapping and shipping averaged less than 1 percent." The trap is fully illustrated both by photographs and drawings, its construction described and a bill of materials provided.

Management: Water supply for desert quail

Rahm, Neal M. Quail range extension in the San Bernardino National Forest--Progress Report, 1937, California Fish and Game (Ferry Bldg., San Francisco, Calif.), 24(2), April 1938, pp. 133-158, figs. 41-56, 5 tables.

Statement of the essentials of quail range; water is usually the limiting factor in southern California. Account of establishment of water supplies as a means of encouraging utilization of range. The area selected on desert north slopes of the San Bernardino Mountains is one that had been tested for its agricultural possibilities and abandoned. Description and illustration of 2 types of watering devices and statistics as to their consumption of water. They were successful in attracting and holding quail and may be an aid in increasing the extent of public shooting grounds. The mountain quail is too easy a mark and development of its range is not recommended. Notes on habits of quail and predators.

Pollution

Thomas, Charles W. Coast Guard fights pollution, Outdoor America (1167 Merchandise Mart, Chicago, Ill., 10 cents a copy), 3(6), pp. 6-7. April 1938.

Functions of the Army Engineers, Coast Guard, and Customs Bureau in combating pollution, and account of a campaign with State cooperation in southern California. 115 out of 121 cases of oil and refuse pollution solved; penalties assessable; methods of investigation. "The harbors and coast of southern California are the cleanest they have been in many years."

Predation

Breckenridge, W. J. A review of predator control, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 57, May 1938, pp. 10-11, 23-26, 3 photos.

Essentially a compiled account, the sources of which are given in a terminal bibliography of 12 titles. Most hunters advocating predator control "do not seem to appreciate what tremendously complex and powerful natural forces they are opposing in trying to bring about an unnatural, Utopian situation where game is continuously superabundant. They do not look ahead for the less evident, ultimate results of such short-sighted moves as 'vermin' extermination. They do not stop to figure out that if they kill off all the hawks and owls that prey to some extent on game species, they are at the same time removing effective natural checks on ground squirrels, mice, rabbits and like forms that in turn destroy cover for game birds." "And food" should be added. The author cites a case of general predator control in California where no hunting was allowed and the quail population steadily decreased. Apparently this was due to increase in ground squirrels that devoured the quail eggs. Attention is given to the bounty system and Pennsylvania's adverse report is quoted. "Improvement in the environment of animals is much more effective in increasing game populations than are extreme measures of predatory animal control."

Predation

Gordan, John W. Winged killers, American Field (222 W. Adams St., Chicago, Ill., 20 cents a copy), 129(21), May 21, 1938, pp. 619-620.

WILDLIFE REVIEW has ignored a number of articles on "vermin" in the sporting press because, as a rule, they are obvious products of prejudice and error, but the contrast between Breckenridge's reasonable treatment (abstracted above) and the present citation, read the same day, indicated the desirability of breaking silence.

We read in the article on "Winged killers" that, "From the viewpoint of the hunter and conservationist all hawks are bad." This is so broad a misstatement that it would be disclaimed by a vast majority of those who are entitled to be called conservationists. In fact, it is doubtful whether a single genuine conservationist could be found who would agree that "all hawks are bad." The author further states that "the sharp-shinned hawk is without a single virtue" and "there is nothing that can be said in its favor." The truth is, however, that even this bird-hawk feeds to some extent on mice and insects. After these extreme remarks on the sharpshin, the author writing of all the species of the darter group, says that the goshawk "has the worst reputation of the three"--i.e., worse than having not a single virtue. Referring to the diet of the red-shouldered and red-tailed hawks, the writer states that

"game birds predominate when they are available." This might be true if stated as when proportionally available, but not under any other circumstances. On the average, about one meal in 50 of these hawks includes a game bird.

The snowy owl is said to be "almost as bad as the great horned" but records of stomach analysis do not bear this out. The author adds that "The depredations of this owl among the game birds particularly has always resulted in a heavy bounty being placed on it and it is usually the case that it is by far the most valuable predatory creature in the wilds." Presumably this means valuable to the bounty hunter, but the whole sentence is unfounded; according to the latest available summary (Leaflet BS-24, 1935) of bounty laws, bounties could legally have been paid on snowy owls in only one or two of all the United States. Referring to the screech, short-eared, and long-eared, owls the writer says that "they all kill game birds plentifully and while they do eat many small rodents, such as mice, moles, and rats, this fact cannot be advanced in their defense." The first part of this statement is untrue and the second shows only prejudice. If the economic worth be not taken as a guide for man's policies toward wildlife, there is no sound standard left. If harm is to be reckoned against, why should not good be counted in favor, of a predator? None are wholly bad or entirely good. If creatures are to be condemned for their shortcomings and contrasting evidence not considered in defense, then no living thing can escape the fatal sentence.

Summing up, the author says, "Indeed, nothing can be said which will justify the toleration of any of the winged killers. x x x They destroy game, both furred and feathered, preferring such food to the vermin which they might destroy instead." For sublime error the latter sentence can hardly be beat, while the former is so anachronistic in its point of view as to be absurd; witch-burning today would not be more so.

Apparently this tirade was inspired by the author's seeing a hawk kill one of a covey of ruffed grouse, but it was in a place where no "grouse had ever been seen before," and which he visited reluctantly, not expecting to find any of the birds. Evidently it did not occur to him that the grouse must have been thriving and increasing to occupy new territory in the face of predators. That is the trouble, there is little thought or judgment concerned with these outbursts and they should be rejected on sight by editors as not being in accordance with fact and with modern more sensible and realistic views on predation.

Predation: Methods of gray fox

Nelson, A. L., and C. O. Handley. Behavior of gray foxes in raiding quail nests, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 73-78.

Field experiments in Virginia with 8 transplanted nests, described with particular reference to approach of the animals, degree of interference with nest structure, and evidence as to egg eating. There was little disturbance of the nests and seldom any fragments of shell left to tell of the robberies which were completed in from one to a few visits.

Predators: "Vermin" control

Deck, Raymond B. Guest book of vermin. Hitting the happy medium in predator control, Country Life and The Sportsman (Philadelphia, Pa., 50 cents a copy), 73(6), April 1938, pp. 37-39, 103-106, 5 photos.

A plea for moderation in "vermin" control. "It's becoming clearer every day now that the safe, wise way to increase the game supply is to ease up on killing vermin and put our energies on improving cover and food-supplies instead." Cats should be licensed as a step toward elimination of feral individuals. "Super-controlling vermin has never yet forestalled the down cycles of game."

Predators: Wolf

Olsen, Sigurd F. A study in predatory relationship with particular reference to the wolf, Scientific Monthly (Science Press, Lancaster, Pa., 50 cents a copy), April 1938, pp. 323-336, 6 photos, 3 maps.

Predators have been eliminated without regard for the influence they might have upon the balance of life in the communities of which they are a part. Game refuges have often been administered as herbivore sanctuaries so that primitive conditions under which hoofed game retains its natural alertness are now mostly lacking. Probably more wolves remain in the Superior National Forest in northeastern Minnesota than in any other part of the United States. Despite popular belief that wolves live upon deer, the food in summer includes grouse, mice, voles, marmots, fishes, snakes, insects, and some vegetation. In fact almost anything that crawls, swims, or flies may be included in the diet. In winter when most of the small mammals are in hibernation and other items of the summer food unavailable, the wolves are forced to feed almost entirely upon deer and snowshoe hares. When food is scarce, three or four meals a month will keep a wolf from starving.

Conditions of the Superior National Forest environment, hunting habits of the wolves, and organization and range of the packs are described. [A previous paper on this last topic was abstracted in WILDLIFE REVIEW, No. 13, March 1938, p. 10.] The author contends against the belief that wolves kill wantonly. He interprets apparently excess killing when opportunity affords as an instinctive first step in a process of building up a reserve food supply. Carcasses not consumed at first under natural conditions would be revisited and eaten later. The author believes that the poisoning of carcasses and setting traps around them has instilled fear to such an extent that wolves are very reluctant to approach them. Thus control campaigns prevent the animals from eating all of their kills and compel them to kill more than they would if unmolested.

There are about 250 wolves on the area discussed and they kill about 1,500 deer annually. The deer population is in the neighborhood of 20,000 animals, a herd that can stand yearly loss of about 4,000 without diminution of the breeding stock. The presence of wolves in a wilderness area instead of being a hazard is an asset to big game. The majority of the kills are old, diseased, or crippled animals, the elimination of which is a benefit to the

stock and the depredations of the wolves conduce to a desirable state of alertness on the part of the deer. Experience on the Superior National Forest demonstrates that sanctuary can be given to both carnivores and herbivores without danger of decimation of the big game. Bibliography of 20 titles.

Propagation: Care of eggs

Rockwell, M. J. Storing and shipping hatching eggs, Modern Game Breeding (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 8(5), May 1938, pp. 4-5.

Notes on factors affecting viability and how to control them in storage and shipment; description of methods.

Propagation: European partridge

Anon. A diary of the partridge rearing field at Knebworth in 1937, I. C. I. Game Researches (Imperial Chemical Industries, Millbank, London, England), Advisory Leaflet 17, 22 pp., April 1938.

The bulk of this leaflet consists of quotations from a Captain Moser's diary of experiences with partridges from June 13 to August 9. Notes on management of the birds are interspersed with those on mishaps and disappointments. Two of the reasons for reproducing the diary were to hearten gamekeepers and to moderate expectations on the part of employers by showing that difficulties are encountered on the best managed rearing fields. There are paragraphs of suggestions on handling of bantams and partridge chicks of different ages, and coops and runs, on dusting shelters, unhatched eggs, percentage of hatch, foods including ants' "eggs" and substitutes for them, trampling, coccidiosis, and rubber wing bands for marking the birds, besides a general summary of results for the season.

Propagation: Irradiation results

Bissonnette, T. H. Experimental control of sexual photo-periodicity in animals and possible applications to wildlife management, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 104-118.

Review of experiments with juncos, crows, starlings, ferrets, etc., in activating the sexual cycle by increasing "length of day" by artificial lighting, followed by more detailed accounts of similar work with the bobwhite, ringneck pheasant, and raccoon. "It is evident that control of length of day and of type of food are potent methods of controlling the times at which animals may breed and of increasing or prolonging their productivity." Extensive bibliography.

Propagation: Irradiation results

Bissonnette, Thomas H., and Albert G. Csech. Interrupted night-lighting with pheasants, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.50 a copy), 19(2), April 1938, pp. 181-187.

Arousing sexual activity by increased lighting having been demonstrated, "it became of interest to see what occurs when experimental lighting is stopped and birds x x x returned to normal conditions of day-length after being well started in reproduction by forced lighting." The experiments recorded "show that laying at a reduced rate will continue even after the daily period is reduced by six hours just at the beginning of the normal laying season of pheasants. The infertility of the eggs laid subsequent to the reduction of daily light by six hours per day to the normal daylength for the season was due probably to sexual regression of the males resulting from the reduction."

Propagation: Mountain quail

Caughlin, Pat. H., and Ethel Caughlin. Mt. quail at Baldy Mesa Game Farm, Modern Game Breeding (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 8(7), July 1938, pp. 4-5, 1 photo.

This farm is in the native range of the mountain quail. Success is attributed to that circumstance, to winning the confidence of the birds, and to providing natural cover and foods in the pens. Nevertheless an average of only about 20 eggs a year has been obtained. The birds are kept in groups of 10-15 pairs in each pen. Bantam hens are used to brood the young. The control of lice is important and is accomplished by the use of cooking oil in preference to a powder. First food for the young is cottage cheese from skimmed milk and hard-boiled egg yolk, soon supplemented by a damp mash of 19 percent protein content, and later by grains and greens.

Propagation: Shipping pheasants

Yessler, G. Fred. Merchandising pheasants, Modern Game Breeding (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 8(5), May 1938, pp. 5-6.

Suggestions as to shipping crates.

Research: Hair identification

Mathiak, Harold A. A rapid method of cross-sectioning mammalian hairs, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 2(3), July 1938, pp. 162-164, 1 fig.

Author's abstract: "A coating of a solution of celluloid in acetone is placed on a stick of balsa wood. One or more hairs are laid on the sticky solution. Additional celluloid is placed on the hairs and allowed to dry. Sections about .6 mm. thick are sliced with a razor blade and examined under a microscope with transmitted light."

Research: Marking animals for identification

Carmichael, Emmett B. A system of numbering laboratory animals, Science (Lancaster, Pa., 15 cents a copy), 87(2268), June 17, 1938, pp. 557-558, 1 fig., 1 table.

A system of marks consisting of notches, holes, and slits in the ears, clipped toes, and bobbed tails, that has a capacity of 299,999.

WILDLIFE RESEARCH AND MANAGEMENT LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of Agriculture, Washington, D. C.

BS-109. Fort Niobrara Game Preserve, Nebraska, by Clara Ruth, 7 pp., 2 pls., April 1938.

Location and purpose; history; occupants as big game, Texas longhorns, smaller mammals, and birds; improvements; miscellaneous features. List of 10 other refuges maintained primarily for big game animals.

BS-110. Status of eelgrass (Zostera marina) on the North Atlantic Coast, February 1938, by Clarence Cottam, 7 pp., April 1938.

Review of previous accounts of the eelgrass wasting disease referring to 8 articles cited in a terminal bibliography. Description of "present" conditions by regions; summary, not optimistic; and account of experimental transplantings from the West to the East Coast.

BS-111. The waterfowl situation: 1937-38, 10 pp., 2 tables, 1 map, April 1938.

Summary of observations by the Federal flyway biologists with map showing courses of their expeditions, on the status of the North American wildfowl population. Moderately optimistic. Reports from cooperating observers (tabulated) indicate improvement.

BS-113. European and American methods of rat control, by E. M. Mills, 6 pp., May 1938.

Descriptions of rat control with special reference to laws and extensive campaigns in Denmark, England, Germany, and France. General account also of rat control and its history in the United States.

BS-115. Cultural and other methods for the control of injurious wildlife, by Donald A. Spencer, 6 pp., June 1938.

Cultural methods are those involving modification of agricultural practices; examples are given. Defensive control is discussed under the heads of scarecrows, repellents, fences, and transfer of offending animals. Aggressive methods are illustrated by the New England field mouse control campaign which is fully described, particularly as to safeguards employed.

BS-117. Protecting orchard trees from deer, by E. M. Mills, 5 pp., 1 pl., June 1938.

Habits of deer calling for control, and repellent devices and substances. These are described under the captions: scaring devices, sprays, fences (electrified and other), asafetida, naphthalene, flashguns, tar-paper cones, and traps.

NOTES AND NEWS

Of interest to wildlife managers is a publication of the U. S. Forest Service, "The distribution of important forest trees of the United States" (U. S. Dept. Agr. Misc. Pub. 287, April 1938 [July]), which contains maps showing the range of 170 species. It may be obtained from the Superintendent of Documents, Washington, D. C., at 35 cents a copy.

A publication on "Forest rights in foreign countries with especial reference to grazing rights" (Sparhawk, Wm. N., U. S. Dept. Agr. Circ. 456, 67 pp., Dec. 1937 (May 1938), Superintendent of Documents, Washington, D.C., 10 cents a copy) while not relating to wildlife will be useful to those interested in forest and range management. The writer insists on the dangers of allowing privileges to become rights and declares that "It is no doubt true that unregulated grazing has been the cause of vastly more forest destruction than commercial lumbering or any other form of timber use."

Carleton College, Northfield, Minnesota, an institution not mentioned in BS-98, "Colleges and universities offering courses in wildlife management," has issued a booklet "Natural history at Carleton College" that describes the facilities and courses of instruction in natural history (including geology, geography, conservation, botany, animal biology, ornithology, and entomology), and lists the faculty and their qualifications. The training is planned as preparatory to specialization for technical or administrative positions in wildlife management, forestry, soil conservation, or other biological services, local or national.

AUTHOR INDEX FOR THIS ISSUE

	Page		Page
Allen, Durward L.	13	Cahalane, Victor H.	25
Andrews, C. L.	5	Carlson, W. E.	8
Atwood, Earl L., Jr.	17	Carmichael, Emmett B.	41
Bennett, Logan J.	22	Case, George W.	28, 35
Bishopp, F. C.	7	Caughlin, Ethel	41
Bissonnette, T. H.	40	Caughlin, Pat. H.	41
Bond, Richard M.	28	Chaddock, T. T.	7
Bordner, John S.	14	Cheatum, E. L.	10
Boughton, Donald C.	7	Chitty, Dennis	5
Bradt, Glenn W.	21	Clarke, C. H. D.	9
Brant, Irving	5	Coatney, G. Robert	6
Breckenridge, W. J.	17, 37	Collinge, Walter E.	19
Burleigh, T. D.	17	Conway, Ralph C.	26
Byrd, Elon E.	7	Cooney, Robert F.	28, 29

	Page
Corkran, W. S.	12
Cottam, Clarence	17, 42
Coughlin, Louis E.	20
Csech, Albert G.	40
Cully, Matt.	34
Davison, Verne E.	26
Deck, Raymond S.	34, 39
De Nio, R. M.	29
Dice, Lee R.	11
Dixon, Joseph S.	2
Edminster, Frank C.	27
Elton, Charles	5
Emlen, John T., Jr.	14
Erickson, Arnold B.	8
Erickson, Mary M.	14
Errington, Paul L.	17
Evans, C. A.	8
Fisher, George M.	28
Friley, Charles E., Jr.	22
Gordan, John W.	37
Green, R. G.	8
Green, Wm. E.	23
Greffenius, R. J.	18
Grimmer, W. F.	35
Haig, I. T.	15
Hamilton, W. J., Jr.	2, 24
Hamlett, G. W. D.	22
Handley, C. O.	38
Hanson, Harold C.	17
Harris, Earl S.	16
Hatch, A. B.	29, 34
Headlee, Thomas J.	12
Hearle, Eric	9
Hendrickson, George O.	22, 23
Hibben, Frank C.	23
Hill, R. R.	32
Hope, C. E.	20
Howell, Arthur H.	2
Hubback, Theodore	4
Jellison, Wm. L.	6
Kellogg, H. B., Jr.	6
King, Ralph T.	15
Klemola, V. M.	31
Knowlton, George F.	19
Kofoid, Charles A.	9
Kostron, Karel	22
Lund, Horace O.	7
Maclay, David J.	28, 29
Marsh, Hadleigh	8
Mathiak, Harold A.	41
McLean, D. D.	24
Mills, E. M.	42
Morton, James N.	16, 26
Nelson, A. L.	38
Olivier, Louis	10
Olmsted, Charles E.	10
Olson, Sigurd F.	39
Paddock, F. B.	11
Park, James T.	9
Parsell, J. A.	29
Pederson, F. C.	29
Pieters, A. J.	2
Rahm, Neal M.	36
Richards, Edward C. M.	35
Ridley, H. N.	15
Rockwell, M. J.	40
Ruff, Frederick J.	36
Ruth, Clara	42
Scheffer, Theo. H.	24
Scott, Walter E.	3
Smith, Carroll N.	7
Smith, Frank R.	23
Snyder, L. L.	20
Soulen, Garrett H.	18
Spencer, Donald A.	42
Storer, Tracy I.	35
Stoudt, Jerome H.	11
Swanson, Gustav	33
Taylor, Norman	12
Taylor, W. R.	31
Thomas, Charles W.	36
West, Evaline	6
Wight, H. M.	20
Williams, L. L.	12
Wilson, Kenneth A.	20, 25
Wood, O. M.	10
Yeager, Lee E.	34
Yessler, G. Fred	41
Young, Edward L., III	7
Young, Vernon A.	11

38
ge
2
7
9
8
1
4
2
6
8
0
0
9
1
9
9
9
2
6
5
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